Table 1

	raw powder			sintering condition	properties of sintered body					
	AlN powder		Sm2O3		chemical analysis data			Sm2O3 converted content mol %	Al2O3 calculated content mol %	Sm2O3/ Al2O3 molar ratio
	type	Oxygen content weight%	mol%	sintering temperature ℃	O content wt%	Sm content wt%	C content wt%			
example 1	A	0.97	0.23	1800	1.19	1.53	0.029	0.214	0.831	0.258
example 2	A	0.97	0.12	1800	0.94	0.69	0.029	0.096	0.721	0.133
example 3	A	0.97	0.35	1800	1.23	1.87	0.034	0.263	0.821	0.320
example 4	A	0.97	0.06	1900	0.81	0.35	0.030	0.048	0.653	0.074
example 5	A	0.97	0.23	1900	0.52	0.43	0.028	0.059	0.389	0.152
example 6	B	0.87	0.12	1800	0.85	0.70	0.030	0.097	0.641	0.151
example 7	B	0.87	0.23	1800	1.06	1.43	0.030	0.200	0.729	0.274
example 8	C	0.44	0.06	1800	0.67	0.37	0.038	0.051	0.528	0.097
example 9	C	0.44	0.12	1800	0.71	0.74	0.040	0.102	0.513	0.199
example 10	D	1.20	0.35	1800	1.44	1.84	0.037	0.259	1.013	0.256
comparative example 1	A	0.97	0.02	1800	0.80	0.16	0.031	0.022	0.669	0.033
comparative example 2	A	0.97	0.06	1700	0.85	0.37	0.031	0.051	0.685	0.075
comparative example 3	A	0.97	0.58	1800	1.52	3.55	0.034	0.508	0.856	0.594
comparative example 4	B	0.87	0.35	1800	1.19	2.17	0.033	0.306	0.745	0.410
comparative example 5	C	0.44	0.23	1800	0.82	1.50	0.039	0.209	0.507	0.412

Table 2

properties of sintered body									
	open porosity %	bulk density g/cm3	resistivity 25℃ Ω・cm	resistivity 300 ℃ Ω・cm	activation energy e V	bending strength MPa	thermal conductivity W/mK	average grain diameter of AlN	crystalline phase (excluding AlN)
example 1	0.05	3.30	6E+10	1E+08	0.35	370	101	4	SmAlO3, SmAl11O18
example 2	0.04	3.28	4E+11	6E+08	0.35	344	95	4	SmAlO3, SmAl11O18
example 3	0.02	3.33	6E+11	1E+09	0.34	396	107	4	SmAlO3, SmAl11O18
example 4	0.05	3.27	9E+10	2E+08	0.33	406	89	6	SmAlO3, SmAl11O18
example 5	0.04	3.27	1E+11	2E+08	0.34	399	120	6	SmAlO3, SmAl11O18
example 6	0.04	3.28	2E+11	2E+08	0.37	458	98	4	SmAlO3, SmAl11O18
example 7	0.02	3.30	3E+11	4E+08	0.35	448	105	4	SmAlO3, SmAl11O18
example 8	0.07	3.27	8E+11	9E+08	0.37	399	93	4	SmAlO3, SmAl11O18
example 9	0.04	3.28	7E+11	9E+08	0.36	388	100	4	SmAlO3, SmAl11O18
example 10	0.08	3.34	7E+10	1E+08	0.35	364	102	4	SmAlO3, SmAl11O18
comparative example 1	0.04	3.26	4E+15	1E+11	1.13*	387	96	4	SmAl11O18
comparative example 2	0.07	3.27	3E+15	5E+10	1.14*	368	97	2	SmAlO3, SmAl11O18
comparative example 3	0.05	3.36	1E+15	9E+10	1.18*	444	121	4	SmAlO3
comparative example 4	0.02	3.32	3E+14	1E+11	0.88*	440	111	4	SmAlO3
comparative example 5	0.03	3.30	9E+13	1E+09	1.01*	436	110	4	SmAlO3

★ temperature range for measurement : １５０～４００℃

Fig. 1 is a graph showing the temperature dependency of volume resistivity of the body according to example 1. Fig.1 also shows each graph of temperature dependency of each sintered body according to each of example 2 and comparative examples 6 to 8. The activation energy is a slope of a graph showing temperature dependency of volume resistivity. The activation energy was 0.34 eV (25 to 300 ℃) in the example 1, 0.35 eV (25 to 300 ℃) in the example 2, 1.0 eV (150 to 400 ℃) in the comparative example 6, 0.71 eV (25 to 170 ℃) in the comparative example 7 and 0.69 eV (25 to 170 ℃) in the comparative example 8. The inventive sintered bodies have the activation energies considerably lower than those of the sintered bodies of comparative examples.

When a range of volume resistivity of 1E+12 to 1E+8 (1×10^{12} to 1×10^{8}) Ω・cm is suitable for a substrate of an electrostatic chuck, the sintered body of the example 1 satisfies this range from − 30 to 300 ℃. Similarly, the body of the example 2 satisfies the range from 10 to 400 ℃, the comparative example 6 satisfies it from 150 to 400 ℃ and the comparative examples 7 and 8 satisfy it from 0 to 120 ℃. The sintered body according to the invention may be applied to an electrostatic chuck in a temperature range considerably wider than that of a prior sintered body.

The strength, thermal conductivity and mean diameter of AlN grains were described in table 2. Particularly, the sintered body according to the invention has a strength of 370 MPa, which was higher than those of the comparative examples 7 and 8.

Fig. 2 shows peak profile of X-ray diffraction measurement. According to Fig. 2, AlN phase (JCPDS No. 25-1133) and $SmAlO_3$ phase (JCPDS No. 46-0394) were identified. Another phase was observed at $2\theta = 19$, 20, 22 ° or the like. The peak positions of the another phase correspond with